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ABSTRACT

The intervention in this study focused upon effective test taking, defined as the capacity to use acquired subject matter knowledge to achieve test scores consistent with an individual's knowledge level. This approach also emphasized self-assessment and self-directed learning. The procedure was employed in efforts to enhance a class of medical technology students' performance on the American Society of Clinical Pathologist (ASCP) Registry Examination for medical technologists. The class receiving intervention was compared with two other groups of medical technology students. The intervention approach consisted of three major components: effective test taking instructional procedures, practice and feedback, and self-assessment procedures. A one-way analysis of variance indicated significant differences in performance, with the intervention group showing the highest mean performance on the Registry Examination. Results suggest the employed intervention approach can significantly influence Registry exam performance. (Author/DWH)

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EFFECTS OF TEST-TAKING INSTRUCTION ON A HEALTH PROFESSIONAL CERTIFYING EXAMINATION: AN EVALUATION

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EFFECTS OF TEST-TAKING INSTRUCTION

ON A HEALTH PROFESSIONAL CERTIFYING EXAMINATION:

AN EVALLUATION

ABSTRACT

An interventive approach focusing primarily on effective test-taking methods, but also emphasizing self-assessment and self-directed learning, was employed in efforts to enhance a class of medical technology students' performance on the ASCP Registry Examination for medical techrologists. The class receiving intervention was compared with two other groups of medical technology students. ANOVA indicated significant differences in performances with the intervention group showing the highest mean performance on the Registry Examination. The results suggest the employed intervention approach can significantly influence Registry exam performance.

EFFECTS OF TEST-TAKING INSTRUCTION ON A HEALTH PROFESSIONAL CERTIFYING EXAMINATION: AN EVALUATION

Test performance, in general, plays a significant role in determining individuals' educational successes and, in many cases, their occupational opportunities. For most allied health professions, test performance is crucial in licensure requirements and the accompanying prospects of professional advancement. A recognized phenomenon and concern is that a number of factors, such as test sophistication or test-wiseness, can affect test performance.[1-3] The purpose of educational examinations is or should be, however, to assess levels of knowledge or ability relative to the amount of learning and instruction that has occurred. Consequently, there is the concern that certain individuals fail to effectively demonstrate their capacities on exams because of test-taking factors unrelated to their actual knowledge of test content. Exam performance, of course, is directly related to an individual's approach to test-taking. There have been many attempts to facilitate test-taking processes, and intervention efforts have ranged from systematic desensitization for alleviating test-anxiety to coaching and also to commercial test preparation.[4-8] But the reported results of those studies have been inconsistent. The methods employed in those intervention efforts usually focus upon reducing test-anxiety or increasing test-wiseness to improve performance.

The focus of intervention in this study was on effective test-taking. Effective test-taking, as described here, is distinct from test-wiseness per se or test-anxiety reduction. Test-wiseness is defined as the capacity to use features of the test and the test-taking situation during the test; moreover, test-wiseness is logically independent of the examinee's knowledge of the subject matter.[9] Effective test-taking, on the other hand, is not independent of the examinee's knowledge and for purposes here, is defined as the capacity to use acquired subject matter

knowledge to achieve test scores that are more consonant with an individual's knowledge level.

As regards test-anxiety, there has been some questions of its effect on actual test performance.[10] Currently the results concerning test-anxiety and test performance are mixed as indicated by studies conducted by Harper[11] and Spielberger et al.[12] For instance, the former found test anxiety to be correlated with test performance, but the latter found little or no correlation between test anxiety and performance. The decision regarding the intervention procedure employed in this study was to forego any efforts to formally address test-anxiety or to teach methods associated primarily with test-wiseness as defined. Relative to teaching test-wiseness, an extensive review by Sarnacki[13] did not provide convincing evidence for using such an approach since much of it is based on using cues or weaknesses found in test items. Cues are found more often in teacher-made exam items, whereas items in a professionally prepared standardized test are expected to be well constructed; thus potentially reducing the importance of test-wiseness as an advantage. Effective test-taking, however, can act to ameliorate problems associated with test-anxiety and a lack of test sophistication since it can provide individuals with an enhanced feeling of control over the actual test situation.

At a major university, faculty and administrators in the medical technology division expressed concern about the overall performance of past graduating classes on the American Society of Clinical Pathologist (ASCP) Registry Examination. Based on those students' prior academic credentials, it was generally expected that their scores would have been higher, at least at the national mean score level. In addition, it was suspected that the problem was associated with the students' approaches to standardized multiple-choice tests. Because of the concern over previous ASCP Registry Examination performance and the suspicion that students may need to develop their skills in test-taking, a decision was made to provide intervention that focused on effective test-taking. That concept was in line with

Ebel's[14] notion that students should develop skills in test-taking. The group receiving the intervention was a class of second semester senior medical technology students. The class's mean Registry exam score would then be compared with that of other graduating classes from the same division. The objective of this study was to examine effects associated with the program on Registry exam performances.

The major purpose of the intervention employed in this study was to assist the participants to use acquired knowledge more effectively on tests. The result would likely be a reduction in the number of inadvertent errors when responding to multiple-choice exam items. Also, another purpose was to assist the students to increase their knowledge of content through self-assessment efforts -- self-identification of areas of weakness and strength relative to subject matter.

The principal question addressed by this study was: Can the intervention approach, which was introduced to an entire class of medical technology students, be associated with higher Registry exam scores than other classes from the same division which had not had the intervention?

METHOD

Sample

The subjects consisted of 96 medical technology students comprising four consecutive graduating classes. Students were placed into two basic groups: those receiving intervention (one class of 24), and those not receiving intervention (three classes of 72). The control group was further divided into two groups. Group A consisting of two combined classes (N=48) who took the ASCP Registry Examination one to two years before the intervention group (Group B), and Group C consisting of the graduating class (N=24) who took the Registry exam one year after Group B. Group C was also used to control for possible effects due to changes in teaching during the four year period that might have affected Registry exam scores.

All the students took the ASCP Registry Examination in the summer following their graduation. The entrance requirements during that four year period were reported to be unchanged. Analysis of recorded Scholastic Aptitude Test scores indicated that there were no significant differences between the three groups on that measure.

Procedure

The intervention group, Group B, received a set of six one-hour intervention sessions during six consecutive weeks in the middle of the spring semester. As mentioned, the intervention procedures incorporated the teaching of effective test-taking methods, but the use of cognitive self-assessment in determining knowledge of subject matter was also stressed. The intervention approach contained three major components: 1) effective test-taking instructional procedures, 2) practice and feedback, and 3) self-assessment procedures.

Simulated tests consisting of ASCP Registry Examination-type items that contained material related to subject matter studied by the students, were used in teaching effective test-taking techniques. The objective of using items containing material reflecting what has been or was currently being studied was essentially to insure that the students found meaningful content in the simulated tests. Those tests were also used to allow the participants to practice and reinforce introduced techniques germane to sound test-taking.

The following were general areas addressed or presented in the effective test-taking instructional sessions:

1. General systematic and effective test-taking procedures to reduce unnecessary errors that occur when test-takers: fail to recognize key words in item stems, misread item stems and options, misinterpret information in item stems, respond to questions too hastily, etc.

2. The use of deductive reasoning in decision-making to select correct options while visibly eliminating incorrect options or distractors.
3. Pacing or time-management when taking tests to insure that the test-taker will complete exams in the allotted time, or at least have the opportunity to respond to all items that can be reasonably answered.
4. Encouraging students to use and rely on their knowledge when confronted with items containing unfamiliar or difficult content. Hence, urging them to have confidence in their knowledge particularly when they took great efforts to prepare for the test.
5. For inevitable guessing situations, the use of identifiable cues for assessing the validty of options instead of being constrained to resort to random responses when selecting answers.
6. Simulated exams were used for practicing and reinforcing the effective test-taking approaches introduced.
7. Practice exercises with simulated exams were also used to demonstrate that when effective test-taking procedures are consistenly applied, students should not feel intimidated by exams, but instead view exams as a means to display their knowledge.

During the sessions, students were not only introduced to effective test-taking methods, but they also practiced those methods on simulated exams while receiving immediate feedback on each item. In addition, the participants were instructed to use the simulated exams as self-assessment devices both for reviewing subject materials relevant for the Registry ASCP Examination and also current course content.

A key element in self-assessment was the use of the practice or simulated exams to uncover and correct any weaknesses in students' approach to test-taking and, importantly, to examine weaknesses in knowledge of subject content. Students could then take steps to address self-identified knowledge deficiencies.

Statistical Analysis

One-way analysis of variance (ANOVA), employing the General Linear Models Procedures for unequal cells, was the statistical technique applied to determine existing significant differences between mean group scores on the ASCP Registry Examination. Group contrasts were also made using the Duncan New Multiple Range Test to determine specific differences, if any existed, between the groups.

Results

The ANOVA results showed the existence of significant differences in the group mean scores ($F = 7.42$, $df = 2/95$, $p < .001$). The subsequent applied group contrasts indicated that the intervention group, Group B, had a significantly higher mean Registry score than either Group A or Group B. The mean score of 542 for Group B was 70 and 80 points higher than Group C and Group A, respectively, and differed at the $p < .01$ level from both groups. There were no statistically significant differences between the mean scores of Group A or Group C. In addition, although the Group B comprised only one-quarter of the total sample, the intervention model accounted for 14 percent of the observed variances in the mean ASCP Registry Examination scores. The group mean scores and Duncan New Multiple Range results are shown in Table 1.

TABLE 1

Group Mean Registry Exam Scores
and
Duncan New Multiple Range Test Grouping to Compare Group Means

Groups	N	Mn	s.d.	Multiple Range Groups*
Group A	48	461.90	86.21	B
Group B	24	542.083	69.284	A
Group C	24	472.208	96.863	B

*Group means with different multiple range group letter are significant at $\rho < .05$.

DISCUSSION

Based on the results, it can be concluded that the intervention approach is associated with higher ASCP Registry Examination scores. Because of the significantly higher mean Registry score for Group B, the results suggest that the applied intervention was indeed associated with higher standardized test scores, in this instance, the ASCP Registry Examination.

The aims of the intervention procedure were to teach efficacious test-taking techniques, provide reinforcement through practice and feedback, and introduce the use of self-assessment procedures: to help students determine areas of strength and weakness. Through the use of sound test-taking procedures, it was expected that the students would apply techniques enabling them to demonstrate exam performances more reflective of their knowledge level. By using effective test-taking procedures to reduce unwarrantable errors, students having the requisite knowledge to answer an item correctly would less likely be penalized for inadvertent wrong responses.

Methods allowing increased opportunities for students to demonstrate their actual level of knowledge on important standardized exams such as the ASCP Registry Examination, have meaningful implications. Unfortunately, it seems that most exams

measure not only content or subject matter knowledge but, to a significant extent, test-taking skills as well. For instance, not only must students be prepared to address the exam's content, but they should also be able to effectively demonstrate their degree of preparation through actual exam performances. Many students demonstrating depressed standardized test performances are likely to have inadequate test-taking skills and consequently are penalized for lacking those skills. Intervention efforts focusing on effective test-taking can improve and strengthen needed test-taking skills which would increase the probability of students attaining scores more reflective of their knowledge levels. Students who are not good test-takers are not generally afforded access to advanced education and employment that increased performance might bring.

Test performance will likely continue to have significant bearings on many individuals' lives, as seen in the importance of the Registry Examination for medical technologists. Thus, it seems important that more efforts should be made to insure that not only knowledge and skills relative to test content are learned, but also acquired are the means to effectively demonstrate those factors on the test itself.

Finally, because of the observed results, additional studies in this area are strongly encouraged to see if similar results are observed and to further explore and evaluate the effects of intervention efforts on performance in professional education and the related professions. The implications of the results appear wide ranging.

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